

MORPHOLOGICAL CHARACTERISTICS OF BACTERIAL AND FUNGAL ISOLATES, OF HORSE GRAM AND GREEN GRAM SPROUTS

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ABSTRACT

Sprouts are the rich source of proteins, vitamins, minerals and fibre. Alfalfa sprouts contain Ferrous, Magnesium, Chlorophyll, 8 essential amino acids, fibre and the vitamins like A, B₂, C and D. Nutritional quality of seeds is improved by germination, due to the breakdown of carbohydrates, lipids and storage proteins, into smaller and digestible nutrients, during the complex metabolic process. Further, during the germination process, the anti-nutritional factors will either get reduced or disappear. In University of Agricultural Sciences, Department of Agricultural Microbiology, an experiment was conducted by K. V. K., Bengaluru, during the year 2009-2011 to find the morphological characteristics of fungal and bacterial isolates of green gram and horse gram sprouts. The experiments resulted to show that, the bacterial isolates produce endospores and these were designated as isolate one. Round, small, water droplets like colonies, which are negative for endospore formation were designated as isolate two. Medium sized, yellow pigmented colonies were also found to be negative for sporulation and, they were designated as isolate three. Then, the fungal colonies that are found to be positive for sporulation are designation as isolate one. Colonies with velvety surface and green colour produces spores and they are designated as isolate two. The colonies that are positive for sporulation and in greyish to black colour were designated as Isolate three

KEYWORDS: Rich Source of Proteins & Fungal Colonies

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INTRODUCTION

Green gram is a very nutritious diet, which is consumed in the form of dal and whole dried seeds. It was introduced early in Indo-China, Southern China, Java and then into the West Indies, Central Africa and the United States. Dal is very nutritious and is prepared in the mill, by splitting the seeds. The sprouted mung beans are also found to be highly nutritious. The sprouts are prepared by soaking the beans overnight. Then, the water is drained and the sprouts are placed in a dark room. Then, the water is sprinkled every few hours after which, the sprouts will be ready in three days. On measuring, you can see that, one pound of dry beans gives 6-8 pounds of sprouts. The nutritional value of sprouted beans is higher, when compared to their dried embryo.

Phasleolusaureus is the botanical name of mung bean and it belongs to the family, 'fabaceae'. Other names are mung, mung bean, golden gram and green gram. These are small, green in color and ovoid in shape.

It is the native plant of India and is cultivated since ancient times, but not in a wild state. In India, green gram is

one of the most consumed pulses. It has the tendency to flatulence and is free from heaviness.

Horse Gram is a tropical and subtropical legume, which is also one of the lesser known beans. It is grown mostly under the dry agricultural land, and is utilized as a cattle feed. It is also consumed as sprouts, whole seed and as a whole meal by the people of rural areas in South India.

The chemical composition of Horse Gram is similar to other most commonly cultivated legumes. It is a rich source of iron molybdenum, but deficient in tryptophan and methionine. Comparatively, it has higher levels of trypsin inhibitor and polyphenols more than the bean seeds. It is also found to show haemoagglutinin activities. Mostly, the natural phenols are phenolic acids like P-hydroxy benzoic, 3, 4-dihydroxy benzoic, caffeic, ferulic, vanillic, P-coumaric, syringic and sinapic acids.

Germination, dehushing, cooking and roasting are found to produce effect on the nutritional quality of both the legumes. To reduce the prolonged cooking time of both the grams, it is suggested to soak them in water in order to reduce the cooking time and improve the quality of protein. Moth bean is consumed in the form of sprouts or dal.

MATERIAL AND METHODS

Production of Sprouts of Horse Gram and Green Gram

Horse gram and green gram seeds were washed and soaked in water at room temperature for eight hours. Then, the water should be drained out and the seeds should be tied in muslin cloth for sprouting. The green gram should be tied for two days and horse grams should be tied for three days.

Enumeration and Isolation of Bacteria and Fungi from Green Gram and Horse Gram Sprout Samples Collected from Food marts and Homemade at Intervals

The sprouts that are home-made should be collected. They are prepared by washing the legume seeds for number of times like 1, 2, 3, and 4. Then, these seeds are enumerated and bacteria and fungi were isolated by introducing standard plate count method. The colony formatting units, pigmentation, colony characteristics and sporulation were observed.

Enumeration and Isolation of Bacteria and Fungi from Spoiled Horse Gram and Green Gram Sprouts

From the food marts, the green gram sprouts and spoiled horse gram was obtained. Then, these were screened for the availability of *Staphylococcus aureus*, *E coli*, *Aspergillus* *Rhizopus* *Salmonella* Sp, *Penicillium*sp, and *Mucor*sp, with the use of Eosine methylene blue agar, Bismuth sulphite agar, *Staphylococcus aureus* no 110 agar, and Martin's Rose Bengal agar, using standard plate count method.

RESULTS AND DISCUSSIONS

Bacterial Isolates of Green Gram and Horse Gram Sprout Samples

From horse gram and green gram, the morphological characteristics of bacterial isolates were studied. The results are shown in Table 1.

The colonies were found to be translucent and circular with entire margin. The isolates produce endospores and these were designated as isolate one. Round, small, water droplets like colonies, which are negative for endospore formation were designated as isolate two. Medium size, yellow pigmented colonies were also found to be negative for sporulation and they were designated as isolate three.

Fungal Isolates of Colonies of Green gram and Horse Gram Sprout Samples

From horse gram and green gram, the morphological characteristics of fungal isolates were studied. The results are shown in Table 2.

The colonies are white in colour with cottony growth at the edge and yellow colour at the centre. And, these are found to be positive for sporulation. These are designated as isolate one. Colonies with velvety surface and green colour, produces spores and they are designated as isolate two. The colonies that are positive for sporulation and in greyish to black colour were designated as Isolate three.

Isolation of Harmful Microorganisms from Spoiled Horse Gram and Green Gram Sprouts

From the spoiled horse gram and green gram sprout samples, harmful microorganisms were isolated. These results are shown in the Table 3.

Staphylococcus aureus E. coli, Penicillium and Aspergillus were found to be present, in both horse gram and green gram sprouts. Salmonella was absent.

Table 1: Morphological Characteristics of Bacterial Isolates of Homemade and Food Mart Sprout Samples of Green Gram and Horse Gram

Bacterial isolates from horse gram and green gram sprouts	Colony characteristics	Pigmentation	Sporulation	Gram staining
Isolate 1	Colonies were circular with entire margin, translucent	–	+	+
Isolate 2	Small, round, water droplets like translucent colonies	-	–	-
Isolate 3	Yellow pigmented, medium sized colonies	Yellow colour	–	+

Table 2: Morphological Characteristics of fungal isolates of Homemade and Food Mart sprout Samples of Green Gram and Horse Gram

Fungi Present in Horse Gram and Green Gram	Colony Characteristics
Isolate 1	Yellow colour at the center and white colour cottony growth
Isolate 2	Green colonies, surface velvety to powdery
Isolate 3	Grayish to black colour

Table 3: Harmful Microorganisms Isolated from Spoiled Horse Gram and Green Gram Sprouts Collected from Food Marts

Sprout samples	Bacteria			Fungi	
	Escherichia coli	Staphylococcus aureus	Salmonella	Penicillium	Aspergillus
Horse Gram	+	+	–	+	+
Green Gram	+	+	–	+	+

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